GRAPHING ME AND YOU

Suggested Grade

3

SD Mathematics Strand & Standard *(Primary for Task)*

Statistics & Probability

3.S.1.1. Students are able to ask and answer questions from data represented in bar graphs, pictographs, and tally charts.

Task Summary

Students will collect, record, represent, summarize, compare and interpret data.

Time and Context of Task:

Students will be allowed 4-5 days to collect data and complete graphs.
This activity is an excellent activity for the beginning of the year.

Materials Needed

Paper doll, Graph Paper, Colored Pencils, Scratch paper, Pencils

Author and Lead Teacher for this Task

Deb Ford
Chamberlain Elementary School

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Students will each make a paper doll to represent them. Each day the students will be given a class survey question. Students will answer the question accordingly using their doll. The students will collect, record, represent, summarize, compare and interpret data.

Collect data from survey questions. Formulate questions that can be addressed with the data. Organize and display relevant data using pictographs, bar graphs, and circle graphs.

TASK PROCEDURE

1. Ask the students to design a paper doll resembling them. Place a magnet on the back of the paper doll.

2. Write a different question on the board for five days. If you do this activity at the beginning of the year, you may ask questions that would help you get to know your students.

3. Every morning the students enter the classroom and place their paper doll accordingly. In their notebooks they record the question and the results of the picture graph. Interpret the graph, with at least three statements or questions.

Pictograph Sample

How many siblings do you have?	
0	
1	
2	
3	
4+	

4. Discuss their statements and questions.
   Sample Questions:
   - How many siblings do you have? *Choices: 0, 1, 2, 3, 4+*
   - How many pets do you have? *Choices: 0, 1, 2, 3, 4+*
   - Which of the following is your favorite activity? *Choices: computer, read, watch TV, play outside*
   - What is your favorite subject? *Choices: reading, math, social studies, science*
   - What is your favorite sport? *Choices: softball/baseball, swimming, football, basketball, soccer*
   - What do you think is the most important invention in the classroom? *Choices: chair, eraser, pencil, light bulb, clock*

(Task Procedure – Continued)

5. After five days students will design a bar graph (scaled and labeled) from one of the pictographs. Students may use computer software that helps them organize and represent their data. Students will take their written statements and turn them into questions. For example, if you had made a graph about number of siblings, somebody might have written a sentence, "There were more classmates who had three siblings than one sibling." A matching question might be "How many more classmates had three siblings than one sibling?"

6. Students present their completed graphs and questions. Display the graphs.

Our Classroom Graph

CONTENT STANDARDS

Primary Standard

Strand Name: Statistics & Probability
SD Goal: Students will apply statistical methods to analyze data and explore probability for making decisions and predictions.
Indicator: Use statistical models to gather, analyze, and display data to draw conclusions.
Standard: 3.S.1.1. Students are able to ask and answer questions from data represented in bar graphs, pictographs, and tally charts.

Supplemental Standard

Strand Name: Statistics & Probability
SD Goal: Students will apply statistical methods to analyze data and explore probability for making decisions and predictions.
Indicator: Use statistical models to gather, analyze, and display data to draw conclusions.
Standard: 3.S.1.2 Students are able to gather data and use it to complete a scaled and labeled graph.

NCTM Process Standard

Problem Solving

- Build new mathematical knowledge through problem solving

Communication

- Organize and consolidate their mathematical thinking through communication
- Communicate their mathematical thinking coherently and clearly to peers, teachers, and others
- Use the language of mathematics to express mathematical ideas precisely

Connections

- Recognize and use connections among mathematical ideas
- Understand how mathematical ideas interconnect and build on one another to produce a coherent whole

Representation

- Create and use representations to organize, record, and communicate mathematical ideas

Problem-Solving Strategies

- Drawing pictures graphs and tables
- Modeling
- Looking for patterns
- Use of manipulatives

ASSESSMENT TOOLS

Chamberlain Elementary Schools

Math Rubric

Name: _____ Teacher: Mrs. Ford

Date Submitted: _____ Title of Work: _____

	Criteria				Points
	4	**3**	**2**	**1**	
Explanation	A complete response with a detailed explanation.	Good solid response with clear explanation.	Explanation is unclear.	Misses key points.	____
Use Of Visuals	Clear diagram or sketch with some detail.	Clear diagram or sketch.	Inappropriate or unclear diagram.	No diagram or sketch.	____
Mechanics	No math errors.	No major math errors or serious flaws in reasoning.	May be some serious math errors or flaws in reasoning.	Major math errors or serious flaws in reasoning.	____
Demonstrated Knowledge	Shows complete understanding of the questions, mathematical ideas, and processes.	Shows substantial understanding of the problem, ideas, and processes.	Response shows some understanding of the problem.	Response shows a complete lack of understanding for the problem.	____
Requirements	Goes beyond the requirements of the problem.	Meets the requirements of the problem.	Hardly meets the requirements of the problem.	Does not meet the requirements of the problem.	____
Counter Examples	Includes counter examples.		Does not include counter examples.		____
				Total →	____

Teacher Comments:

Third Grade Statistics & Probability
Performance Descriptors

Advanced	**Third grade students performing at the advanced level:** • create a graph from gathered data; • create a list of events that are certain or impossible.
Proficient	**Third grade students performing at the proficient level:** • answer questions from data represented in graphs; • describe events that are certain or impossible; • complete a given graph.
Basic	**Third grade students performing at the basic level:** • answer simple questions about a graph; • identify events that are impossible.

Third Grade Statistics & Probability
ELL Performance Descriptors

Proficient	**Third grade ELL students performing at the proficient level:** • read and answer questions about data represented in graphs; • identify events as impossible or certain using concrete materials or pictorial representations; • read, write, and speak the language of mathematics.
Intermediate	**Third grade ELL students performing at the intermediate level:** • answer directed questions related to data presented in graphs; • identify events as impossible using concrete materials or pictorial representations; • explain in mathematical terms the sequence of steps used in solving problems; • give simple oral or written responses to questions on topics presented in class.
Basic	**Third grade ELL students performing at the basic level:** • answer directed questions about basic graphs; • recognize and use basic statistics and probability terms; • respond to yes or no questions and to problems presented pictorially or numerically in class.
Emergent	**Third grade ELL students performing at the emergent level:** • answer directed questions about basic graphs; • give simple oral responses to questions on topics presented in class; • imitate pronunciation of statistics and probability terms; • use non-verbal communication to express mathematical ideas.
Pre-emergent	**Third grade ELL students performing at the pre-emergent level:** • observe and model appropriate cultural and learning behaviors from peers and adults; • listen to and observe comprehensible instruction and communicate understanding non-verbally.

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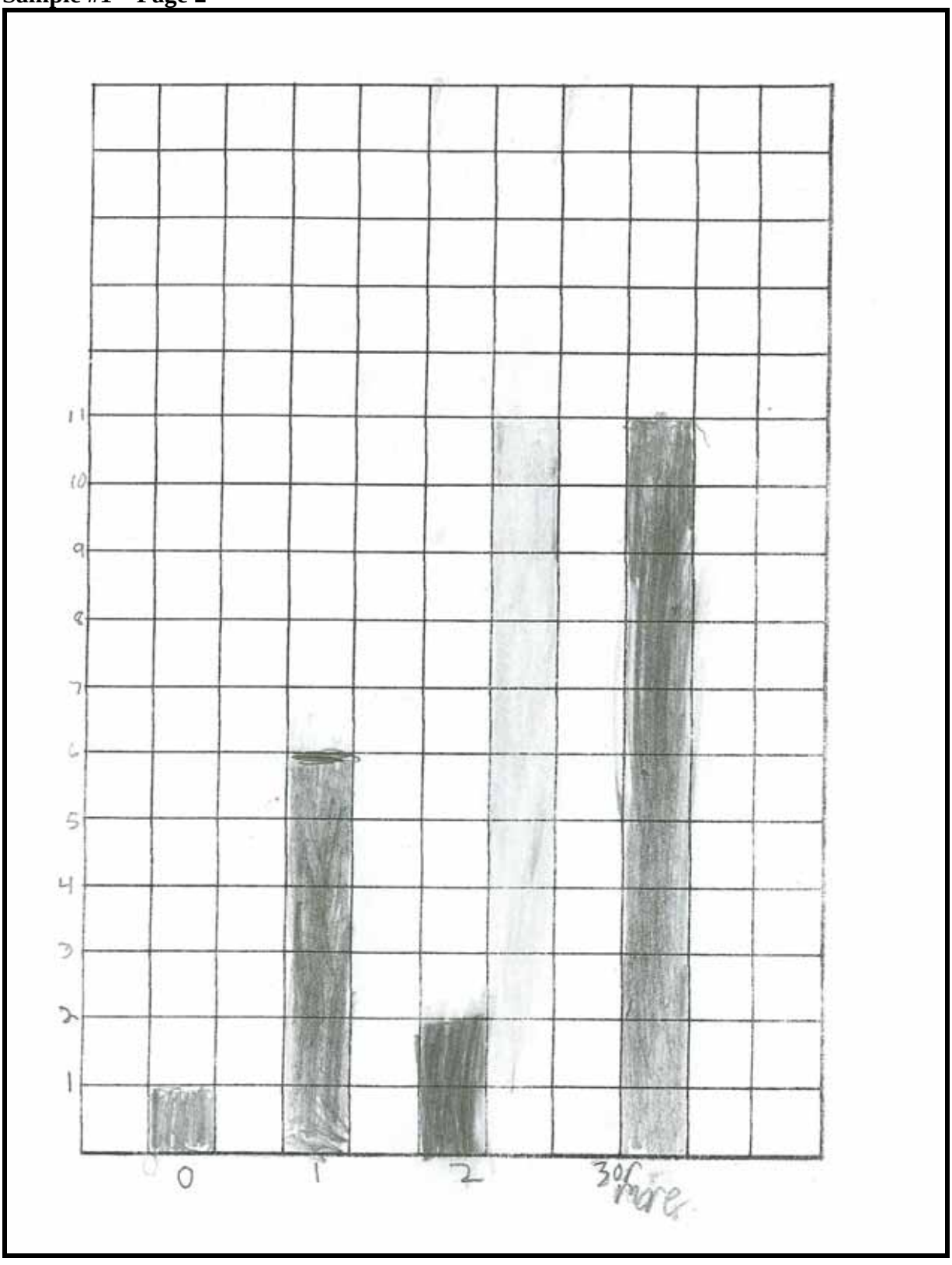
Student Work Samples

As you examine the samples, consider the following questions:

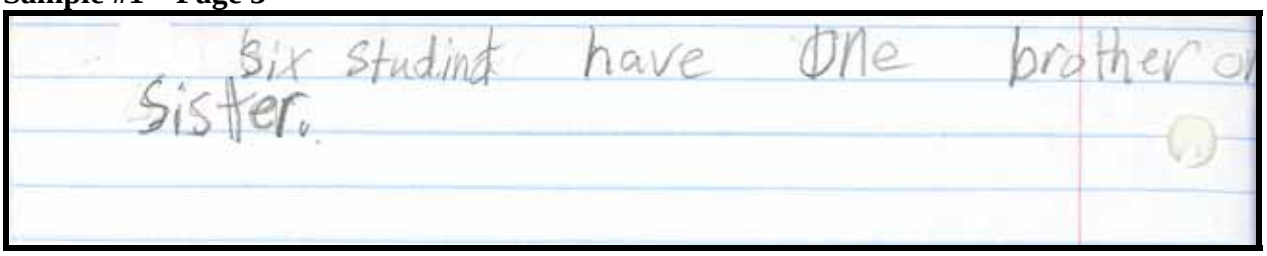
- In light of the standard/s addressed and the assessment tools provided, what evidence does the work provide that students are achieving proficiency in the knowledge and skills addressed by the standard/s for the task?
- Is the task/activity well designed to help students acquire knowledge and demonstrate proficiency? Is the task/activity clearly aligned with the standards? In what ways would you adapt the task/activity to better meet the needs of your students?

Student Work Sample #1

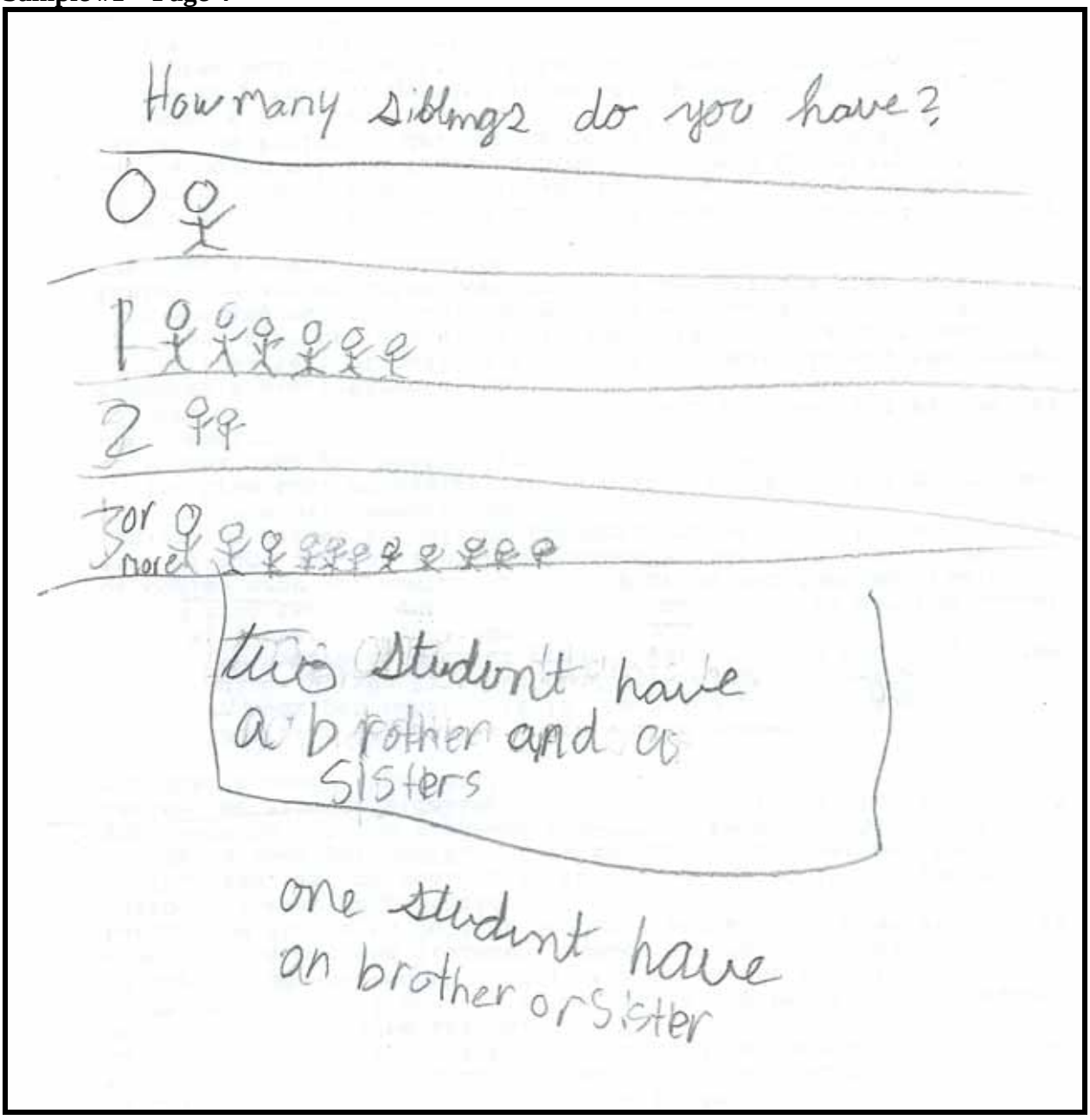
Sample #1 – Page 2



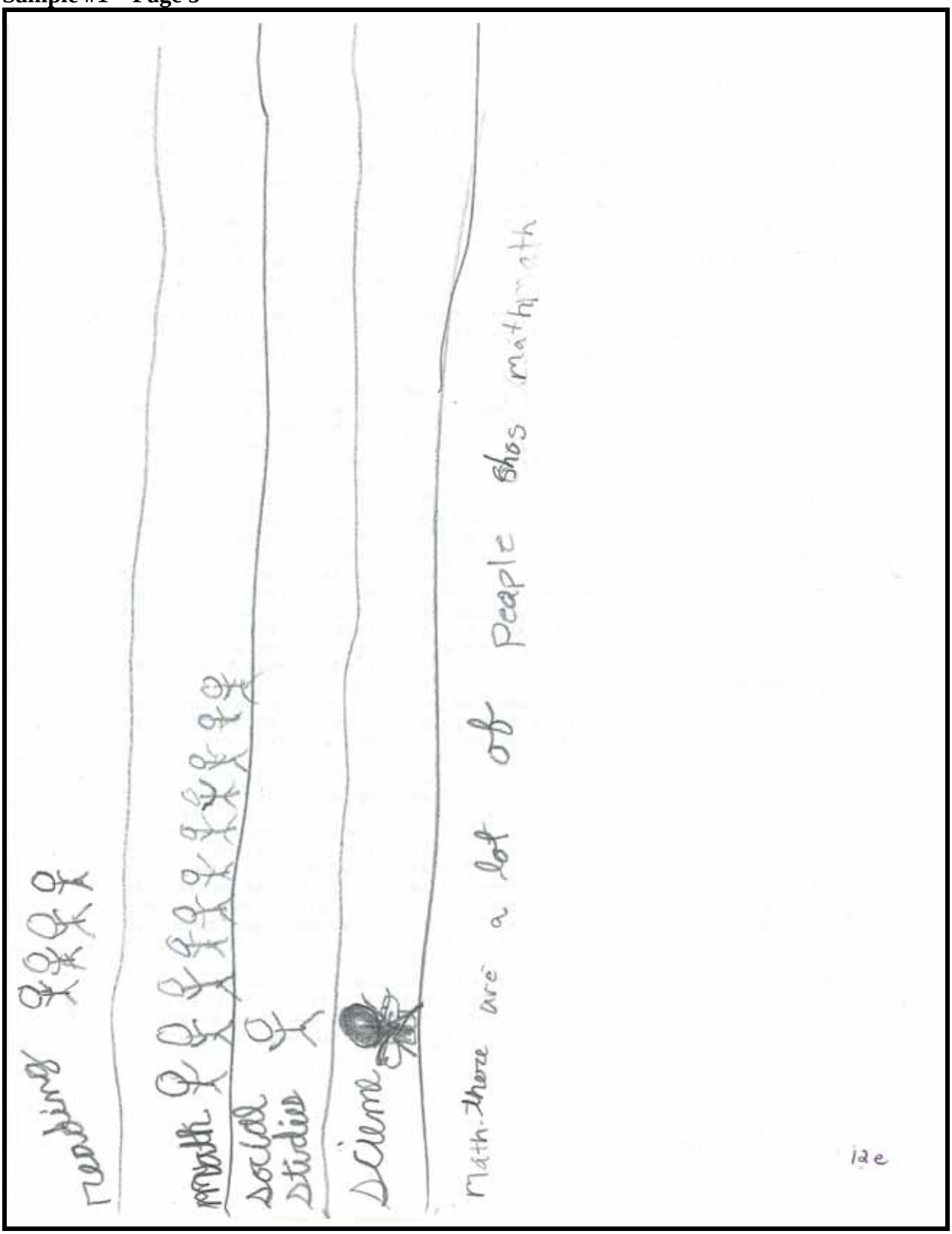
Sample #1 – Page 3



Sample #1 – Page 4



Sample #1 – Page 5



Looking at Student Work – Instructor notes and rating for work sample #1

Chamberlain Elementary Schools

Math Rubric

Name: _____ Teacher: Mrs. Ford

Date Submitted: 10-4-04 Title of Work: Graphing

	Criteria				Points
	4	3	2	1	
Explanation	A complete response with a detailed explanation.	Good solid response with clear explanation.	Explanation is unclear.	Misses key points.	1
Use Of Visuals	Clear diagram or sketch with some detail.	Clear diagram or sketch.	Inappropriate or unclear diagram.	No diagram or sketch.	2
Mechanics	No math errors.	No major math errors or serious flaws in reasoning.	May be some serious math errors or flaws in reasoning.	Major math errors or serious flaws in reasoning.	3
Demonstrated Knowledge	Shows complete understanding of the questions, mathematical ideas, and processes.	Shows substantial understanding of the problem, ideas, and processes.	Response shows some understanding of the problem.	Response shows a complete lack of understanding for the problem.	2
Requirements	Goes beyond the requirements of the problem.	Meets the requirements of the problem.	Hardly meets the requirements of the problem.	Does not meet the requirements of the problem.	1
Counter Examples	Includes counter examples.		Does not include counter examples.		2
				Total---->	11

Teacher Comments: Basic - This work was given a basic score because the student scaled the graph but didn't label it. The statements and questions were in complete.

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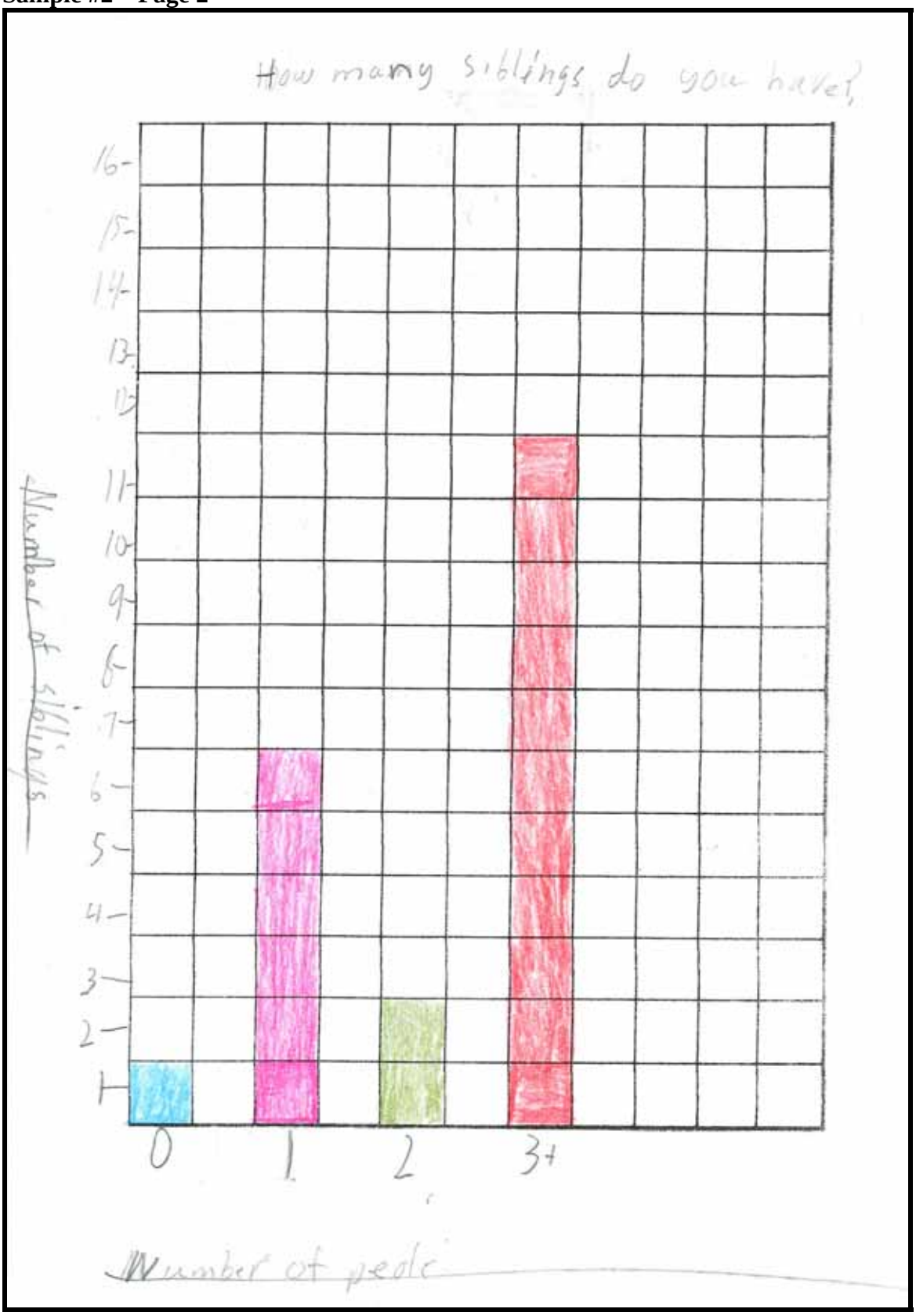
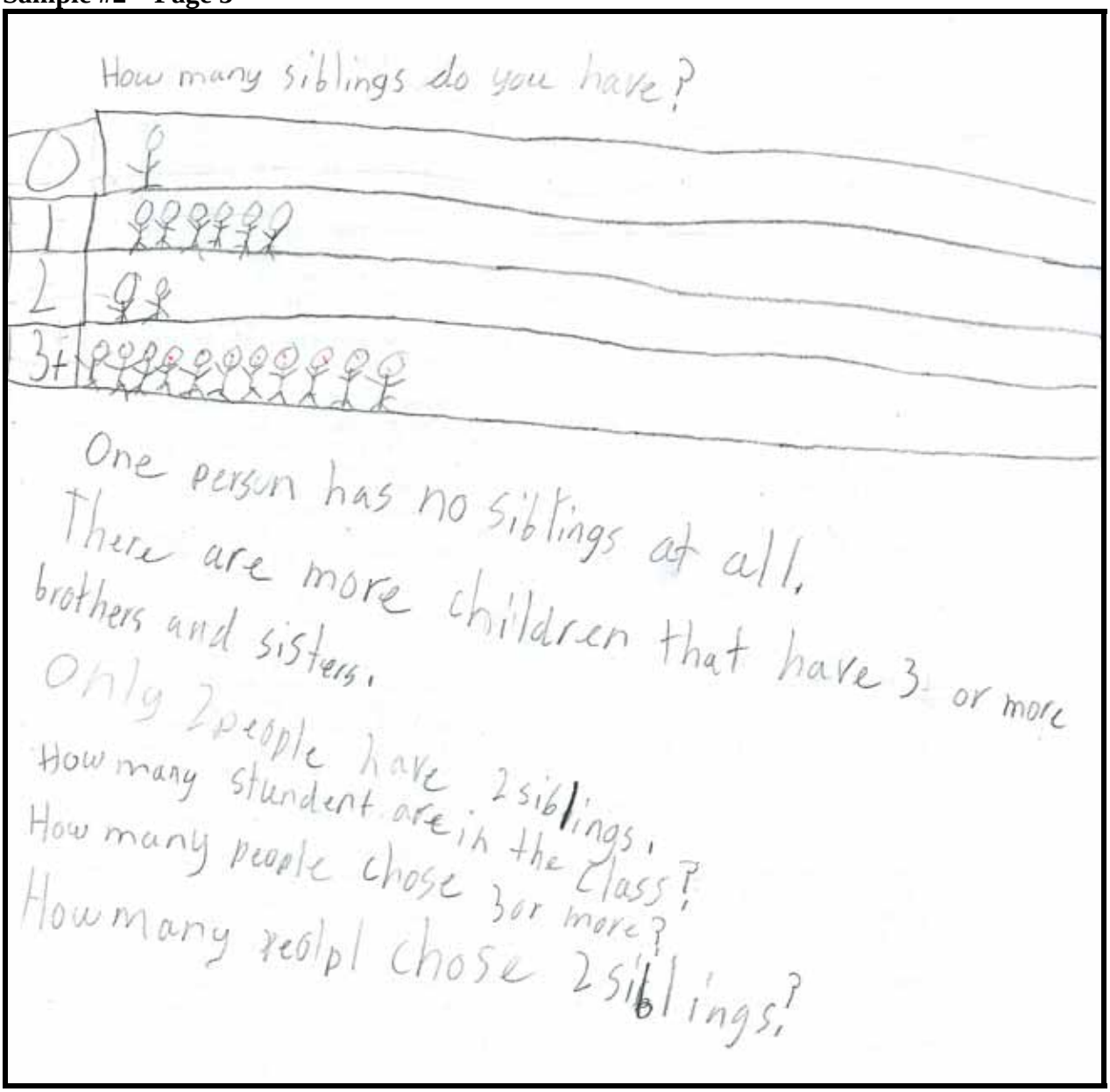
Student Work Sample #2

Sample #2 – Page 2



Sample #2 – Page 3

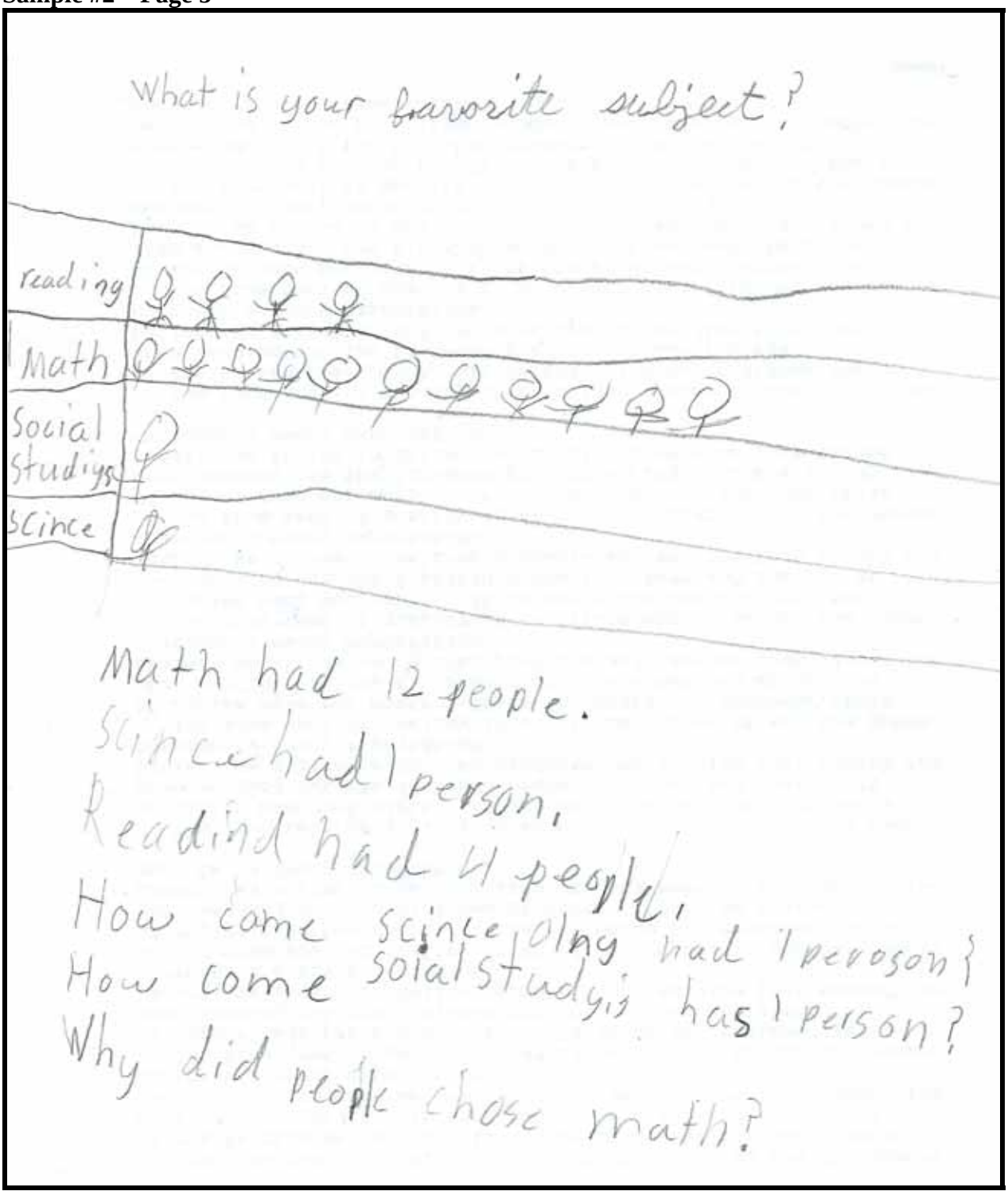


Sample #2 – Page 4

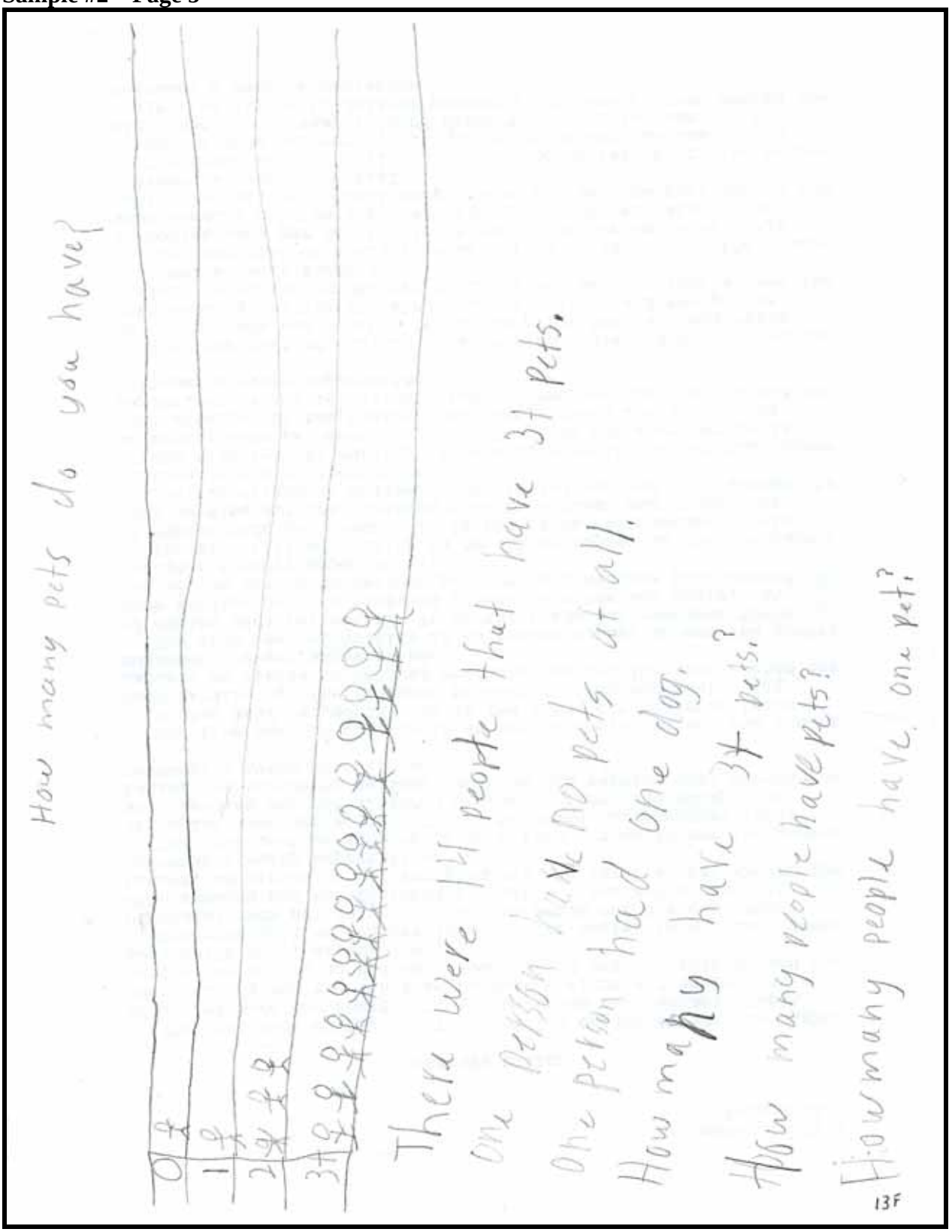
1. One person has no siblings at all.
2. There are more children that have 3 or more.
3. Only 2 people have 2 siblings.

1. How many students are in the class?
2. How many people chose 3 or more?
3. How many people chose 2 siblings?

Sample #2 – Page 5



Sample #2 – Page 5



Looking at Student Work – Instructor notes and rating for work sample #2

Chamberlain Elementary Schools
Math Rubric

Name: _____ Teacher: Mrs. Ford

Date Submitted: 10-4-04 Title of Work: Graphing

	Criteria				Points
	4	3	2	1	
Explanation	A complete response with a detailed explanation.	Good solid response with clear explanation.	Explanation is unclear.	Misses key points.	4
Use Of Visuals	Clear diagram or sketch with some detail.	Clear diagram or sketch.	Inappropriate or unclear diagram.	No diagram or sketch.	3
Mechanics	No math errors.	No major math errors or serious flaws in reasoning.	May be some serious math errors or flaws in reasoning.	Major math errors or serious flaws in reasoning.	4
Demonstrated Knowledge	Shows complete understanding of the questions, mathematical ideas, and processes.	Shows substantial understanding of the problem, ideas, and processes.	Response shows some understanding of the problem.	Response shows a complete lack of understanding for the problem.	4
Requirements	Goes beyond the requirements of the problem.	Meets the requirements of the problem.	Hardly meets the requirements of the problem.	Does not meet the requirements of the problem.	3
Counter Examples	Includes counter examples.		Does not include counter examples.		2
				Total---->	20

Teacher Comments: Proficient - This work was given a proficient score because the student accurately collected data, wrote statements and questions about the data, and completed a bar graph.

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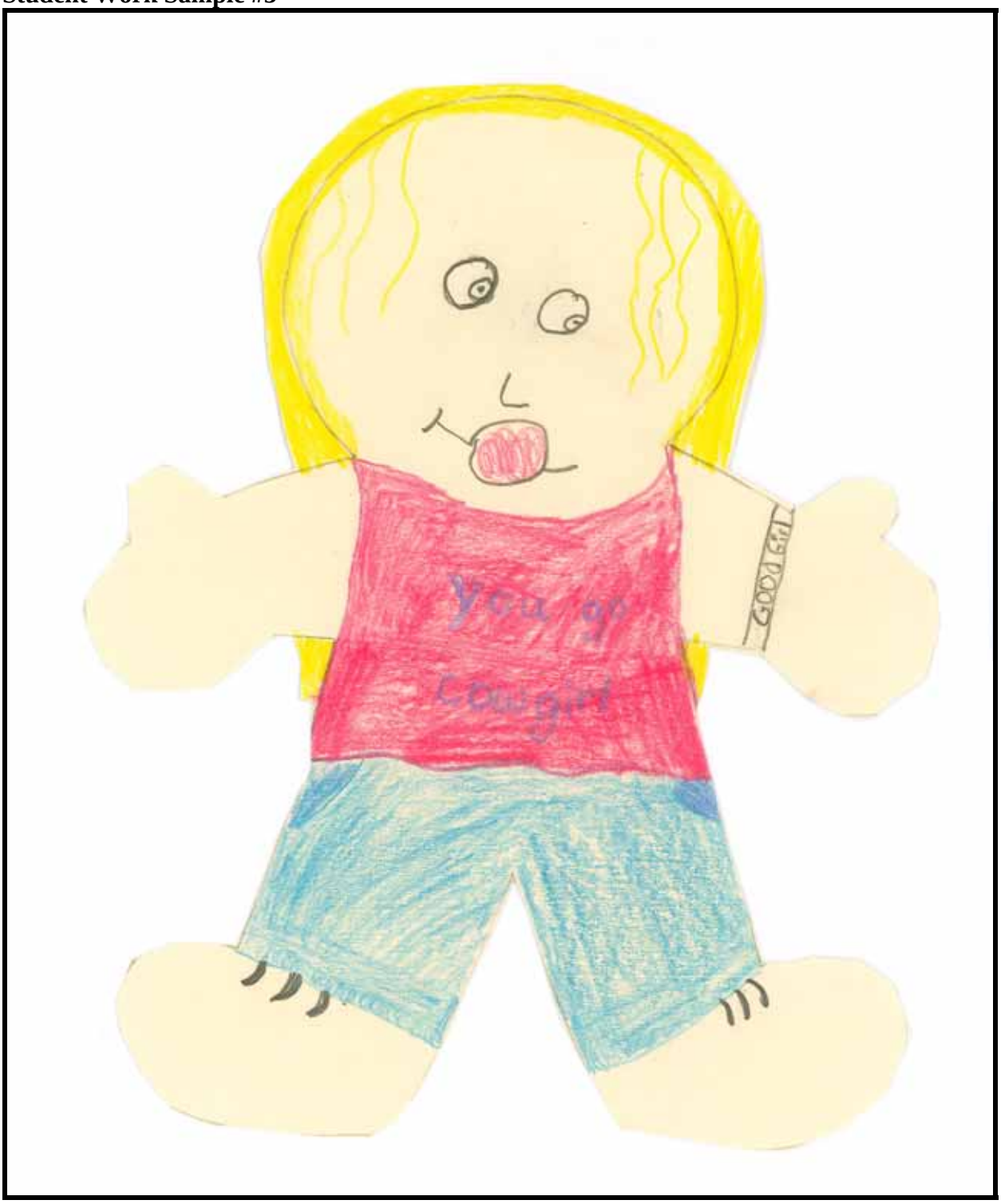
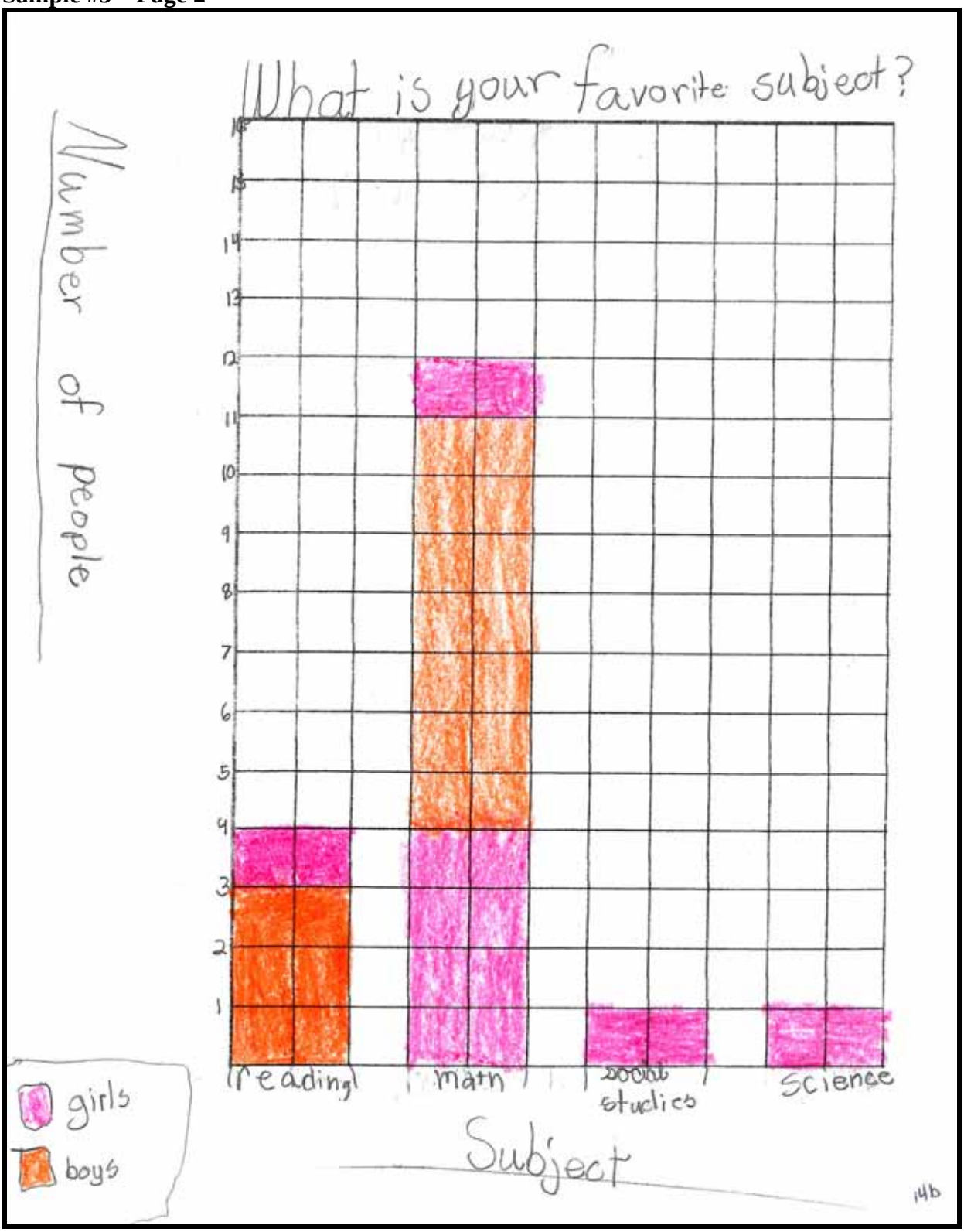
Student Work Sample #3

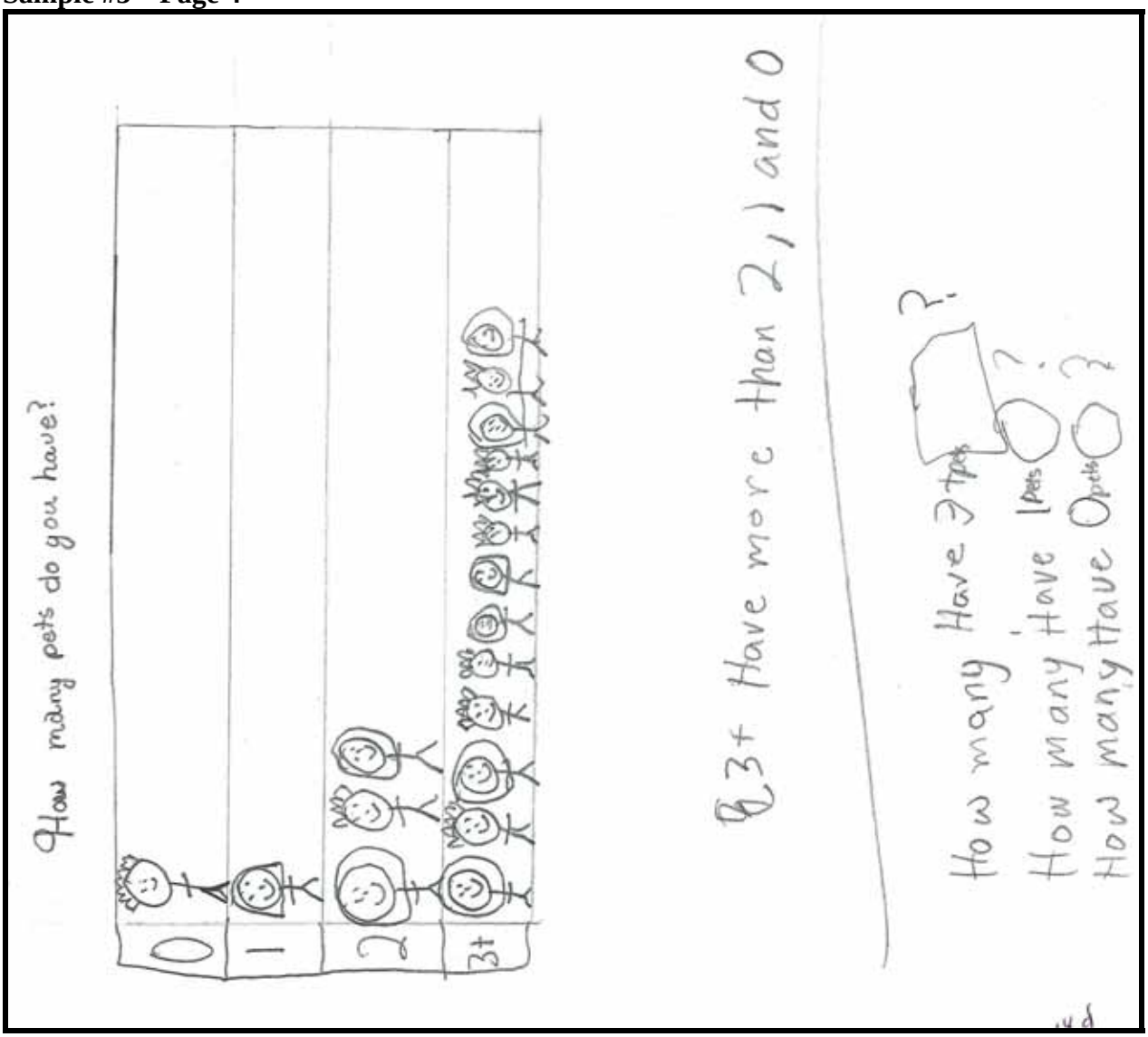


Sample #3 – Page 2



Sample #3 – Page 3

Sample #3 – Page 4



Sample #3 – Page 5

1. Only one person dosen't have any pets.

2. Fourteen people have three or more pets.

3. Over half of our class has three or more pets.

4. How many people have pets?
   19 people

5. How many people have two pets?
   3 people

6. How many people have two and one pets?
   4 people

Sample #3 – Page 6

How many sibblings do you have?

There are more people in 3+ then is 0 and in 1 and in 2. 3+ ~~is~~ ~~the~~ Has the ~~most~~.

How many people are in 3+? ~~11 people~~

How many people ~~are~~ are in 2? ~~2 people~~

How many people are in 1? ~~6 people~~

Looking at Student Work – Instructor notes and rating for work sample #3

Chamberlain Elementary Schools

Math Rubric

Name: _____ Teacher: Mrs. Ford

Date Submitted: 10-4-04 Title of Work: Graphing

	Criteria				Points
	4	3	2	1	
Explanation	A complete response with a detailed explanation.	Good solid response with clear explanation.	Explanation is unclear.	Misses key points.	4
Use Of Visuals	Clear diagram or sketch with some detail.	Clear diagram or sketch.	Inappropriate or unclear diagram.	No diagram or sketch.	4
Mechanics	No math errors.	No major math errors or serious flaws in reasoning.	May be some serious math errors or flaws in reasoning.	Major math errors or serious flaws in reasoning.	4
Demonstrated Knowledge	Shows complete understanding of the questions, mathematical ideas, and processes.	Shows substantial understanding of the problem, ideas, and processes.	Response shows some understanding of the problem.	Response shows a complete lack of understanding for the problem.	4
Requirements	Goes beyond the requirements of the problem.	Meets the requirements of the problem.	Hardly meets the requirements of the problem.	Does not meet the requirements of the problem.	4
Counter Examples	Includes counter examples.		Does not include counter examples.		4
				Total---->	24

Teacher Comments: Advanced - This work was given an advanced score because the student sorted, graphed, and color coded the graph based on the number of responses made by boys and girls. The student also had complete graphs and excellent questions and statements.

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INSTRUCTIONAL NOTES

Author Comments

After looking at the student work I could have given them more detailed instructions on scaling/labeling graphs. Another option would be to give them graphs that are pre-scaled. The various options would depend on how you want to use the task. I wanted to see what these students knew about graphs, so I didn't give them a scaled/labeled graph. It would have been beneficial for special needs children to have a scaled/labeled graph, but I also gained a lot of insight from what they could do without a scaled/labeled graph.

The students thoroughly enjoyed collecting the data and completing the graphs, and having the data pertain to them contributed to the interest in the task.

Resources

SD Mathematics Content Standards
http://www.doe.sd.gov/contentstandards/math/index.asp

SD Assessment and Testing
http://www.doe.sd.gov/octa/assessment/index.asp

The National Assessment of Educational Progress (NAEP)
http://www.doe.sd.gov/octa/assessment/naep/index.asp

National Council of Teachers of Mathematics
http://nctm.org/

Looking at Student Work
http://www.lasw.org/index.html